b) inducing a voltage in a plurality of secondary windings of the transformer in response to the input signal;

c) switching, substantially simultaneously, each of a plurality of switches that are electrically controlled by a respective one of the plurality of secondary windings of the transformer, in response to the single input signal; and

d) maintaining each of the plurality of switches in a substantially conducting state after termination of the input signal by blocking the reverse bias caused by the saturation of the transformer.

B7 Cont.

A marked up version of claims 19, 29, 30 and 31 showing these amendments is included herewith.

REMARKS

The applicants appreciate the Examiner's thorough examination of the application and request reexamination and reconsideration of the application in view of the preceding amendments and the following remarks.

The Examiner has rejected claims 19-31 and 33 under 35 U.S.C. 103(a) as being unpatentable over Dassonville, U.S. Patent No. 4,370,607 in view of Traxler et al., U.S. Patent No. 4,916,599 and Kamei et al., U.S. Patent No. 5,089,719.

Claim 19, as amended herein, sets forth a modulator including a transformer with a primary and a plurality of secondary windings, each secondary winding having an output terminal, a plurality of retriggerable drive circuits, each retriggerable drive circuit

being electrically connected with one of the plurality of secondary windings and having an output and a transformer reflux control circuit, and a plurality of switches, each switch associated with a respective retriggerable drive circuit and having two output terminals and a control terminal, the control terminal of each switch in electrical connection with the respective output terminal of the retriggerable circuit, wherein each of the plurality of switches is substantially simultaneously switched by a first signal applied to the primary and remains substantially on until a second signal is applied to the primary.

Dassonville discloses a method for switching a signal including applying an input signal to a primary, inducing a voltage in a plurality of secondary windings in response to the input signal, and simultaneously switching each of a plurality of switches electrically connected to one of the plurality of windings. Dassonville does not disclose a single transformer including a primary winding and a plurality of secondary windings. Dassonville also does not disclose maintaining the plurality of switches in a substantially conducting state after termination of the input signal. In fact, Dassonville teaches using a series of pulses to maintain the switches in a conducting state until an input signal of "0" is received. See Dassonville, col. 3, line 24-col. 4, line 3. Dassonville does not address how such a scheme would adversely affect the reliability of the individual switches which, in this mode of operation, would eventually fail.

Traxler et al. discloses a switching power supply including means for producing an input signal, a pulse-width modulator responsive to the input signal, a plurality of switching means, a transformer with a primary winding and a plurality of secondary windings, and a means for magnetically coupling the PWM circuit to the switching means

to operate the switching means in response to the input signal in a substantially synchronous operation. However, Traxler et al. does not disclose maintaining the switching means in a substantially conducting state after termination of the input signal.

As the Examiner notes, neither Dassonville nor Traxler et al. disclose a plurality of retriggerable drive circuits electrically connected between the secondary windings and the switches.

Kamei et al. discloses a drive circuit for a semiconductor device including, *inter alia*, a voltage limitation means 26 "to prevent IGBT 27 from being destroyed, or lowered in reliability." See Kamei et al., col. 4, lines 32-34. However, Kamei et al. does not disclose a transformer based system as set forth in claim 19 of the subject application. Kamei et al. does not disclose a transformer reflux control circuit as set forth in amended claim 19 of the subject application. Furthermore, it would not have been obvious to one skilled in the art to combine the disclosure in Kamei et al. with that of Dassonville and Traxler et al. In this case, because Kamei et al. does not disclose or suggest the use of the circuit disclosed therein in systems including transformers, one skilled in the art would not have looked to Kamei et al. for any components to combine with the teachings of Dassonville and Traxler et al. Therefore, claim 19, as amended herein, is allowable over the combination of Dassonville in view of Traxler et al. and further in view of Kamei et al.

Because claims 20-30 are dependent from claim 19, they are allowable over Dassonville, Traxler et al. and Kamei et al. for at least the same reasons as discussed above with respect to claim 19.

Claim 31, as amended herein, sets forth a method of switching a signal including the steps of applying an input signal to a primary of a transformer, inducing a voltage in a plurality of secondary windings of the transformer in response to the input signal, switching, substantially simultaneously, each of a plurality of switches that are electrically controlled by a respective one of the plurality of secondary windings in response to the input signal, and maintaining the plurality of switches in a substantially conducting state after termination of the input signal by blocking the reverse bias caused by the saturation of the transformer.

Neither Dassonville or Traxler et al. discloses a method of switching a signal including, *inter alia*, maintaining the switches in a substantially conducting state after termination of the input signal. Furthermore, Kamei et al. does not disclose maintaining the switches in a substantially conducting state after termination of the input signal by blocking the reverse bias caused by the saturation of the transformer, as set forth in amended claim 31 of the subject application. In fact, Kamei et al. is not directed to a transformer based system and does not address the issue of reverse bias caused by the saturation of a transformer.

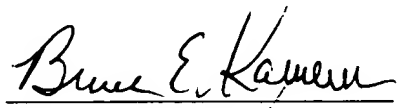
Therefore, claim 31, as amended herein, is allowable over the combination of Dassonville in view of Traxler et al. and further in view of Kamei et al. Claim 33 is dependent from claim 31 and is allowable over Dassonville, Traxler et al. and Kamei et al. for at least the same reasons as discussed above with respect to claim 31.

Each of the Examiner's rejections has been addressed or traversed. Accordingly, it is respectfully submitted that the application is in condition for allowance. Early and

favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts, at (781) 890-5678.

Respectfully submitted,



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9. The modulator of claim 5 wherein the at least one voltage limiter is connected across the input and output terminals of at least one of the plurality of switches.

10. The modulator of claim 1 wherein the plurality of switches are connected in parallel.

11. The modulator of claim 1 wherein the plurality of switches are connected in series.

12. The modulator of claim 1 wherein the plurality of switches are connected in a series/parallel combination.

13. The modulator of claim 1 wherein at least one of the plurality of switches comprises an avalanche-rated field effect transistor.

14. The modulator of claim 1 wherein at least one of the plurality of switches comprises an insulated gate bipolar transistor.

15. The modulator of claim 1 further comprising a logic gate circuit in electrical communication with an input terminal of the primary winding.

16. The modulator of claim 1 wherein the primary winding further comprises an output terminal at ground potential.

17. The modulator of claim 1 wherein the primary winding comprises a distributed primary winding.

18. The modulator of claim 1 wherein the primary winding comprises a plurality of windings connected in parallel.

19. (once amended) A modulator comprising:

a) a transformer comprising a primary and a plurality of secondary windings, each secondary winding having an output terminal;

b) a plurality of retriggerable drive circuits, each of the retriggerable drive circuits being electrically connected with a respective one of the plurality of secondary windings and having an output and a transformer reflux control circuit; and

c) a plurality of switches, each switch associated with a respective retriggerable drive circuit and having two output terminals and a control terminal, the control terminal of each switch being in electrical communication with a respective output terminal of the retriggerable drive circuit,

wherein each of the plurality of switches is substantially simultaneously switched by a first signal applied to the primary and remains substantially on until a second signal is applied to the primary of the transformer.

20. The modulator of claim 19 wherein at least one of the first and second signals comprises a negative going signal.

21. The modulator of claim 19, wherein at least one of the first and second signals comprises a positive going signal.

22. The modulator of claim 19 wherein at least one of the first and second signals comprises a pulse.

23. The modulator of claim 19 wherein the first signal is different than the second signal.

24. The modulator of claim 19 wherein the transformer further comprises a toroidal core.

25. The modulator of claim 19 wherein the modulator comprises a stack of modulators sharing the primary of the transformer.

26. The modulator of claim 19 wherein each secondary winding of the transformer controls a respective plurality of switches.

27. The modulator of claim 19 wherein at least one of the plurality of switches comprises an avalanche-rated field effect transistor.

28. The modulator of claim 19 wherein at least one of the plurality of switches comprises an insulated gate bipolar transistor.

29. (once amended) The modulator of claim 19 ~~wherein at least one of the plurality of retriggerable drive circuits comprises~~ in which the transformer reflux control circuit includes a Zener diode connected in series with a field effect transistor.

30. (once amended) The modulator of claim 19 ~~wherein at least one of the plurality of retriggerable drive circuits comprises~~ in which the transformer reflux control circuit includes a bipolar voltage limiting means.

31. A method of switching a signal, the method comprising the steps of:

a) applying an input signal to a primary of a transformer;

b) inducing a voltage in a plurality of secondary windings of the transformer in response to the input signal; and

c) switching, substantially simultaneously, each of a plurality of switches that are electrically controlled by a respective one of the plurality of secondary windings of the transformer, in response to the single input signal.

32. The method of claim 31, further comprising the step of maintaining each of the plurality of switches in a substantially conducting state after termination of the input signal.

33. The method of claim 31, further comprising the step of applying a reset input signal to the single primary winding of the transformer.

34. A modulator comprising:

a) a plurality of stacked transformers sharing the same primary, wherein the primary comprises at least one winding and each transformer further comprises

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Gaudreau *et al.*	Paper No:	
Serial No:	09/479,982	Group:	2836
Filed:	January 10, 2000	Examiner:	Rios, R.
For:	HIGH POWER MODULATOR	Docket No:	DVT-114J

Box Response
Assistant Commissioner for Patents
Washington, DC 20231

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to Box Response, Assistant Commissioner for Patents, Washington, DC 20231, on August 23, 2001.

Marianne G. Tarazal

RESPONSE

This Response is in reply to the Office Action mailed March 23, 2001 in the subject application. In response to the Office Action, please amend the above-identified application as follows.

AMENDMENT A

Please amend the application as follows:

In the claims:

Please cancel claims 1-18, 32 and 34.

Please amend claim 31 as follows:

31. (~~once~~ twice amended) A method of switching a signal, the method comprising the

steps of:

a) applying an input voltage to a primary of a transformer;

b) inducing a voltage in a plurality of secondary windings of the transformer in response to the input signal;

c) switching, substantially simultaneously, each of a plurality of switches that are electrically controlled by a respective one of the plurality of secondary windings of the transformer, in response to the single input signal; and

d) maintaining each of the plurality of switches in a substantially conducting state after termination of the input signal by blocking the reverse bias caused by the saturation of the transformer.

A marked up version of claim 31 showing these amendments is included herewith.

REMARKS

The applicants appreciate the Examiner's thorough examination of the application and request reexamination and reconsideration of the application in view of the preceding amendments and the following remarks.

The Examiner has objected to the declaration because of non-initialed and/or non-dated alterations contained therein. A new declaration is enclosed herein.

The Examiner has rejected claims 1-18, 31, 33 and 34 under 35 U.S.C. 103(a) as being unpatentable over Dassonville, U.S. Patent No. 4,370,607 in view of Traxler et al., U.S. Patent No. 4,916,599.